



Reconstructing the Southern Annular Mode over the last millennium: Does methodology matter?

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Several studies have attempted to reconstruct the variability of the SAM over the last 500-1000 years. These studies have used different proxy records sourced from different regions and created their reconstructions using either regression techniques or a form of Composite Plus Scaling (CPS). These reconstructions, while sharing some similarities still contain significant differences from one another. Due to the differences in input data, reconstruction methodology and calibration, it is not clear why there is not more agreement between reconstructions or what the optimal approach may be.

In this study, we use a large, geographically diverse pool of terrestrial proxy records to reconstruct the SAM over the past 1000 years. In doing so, we utilise two possible reconstruction methods: a multi-linear regression method and a weighted CPS method as well as using 3 different SAM indices as calibration points for our reconstructions. Results suggest that the SAM index used to calibrate the reconstruction can result in significant differences, while the method is less important. In addition, there is significant low frequency variability in the 16, 32 and 64 year periodicities in almost all reconstructions, suggesting that the typical high frequency variability of the SAM in the present day is modulated over longer time-scales.